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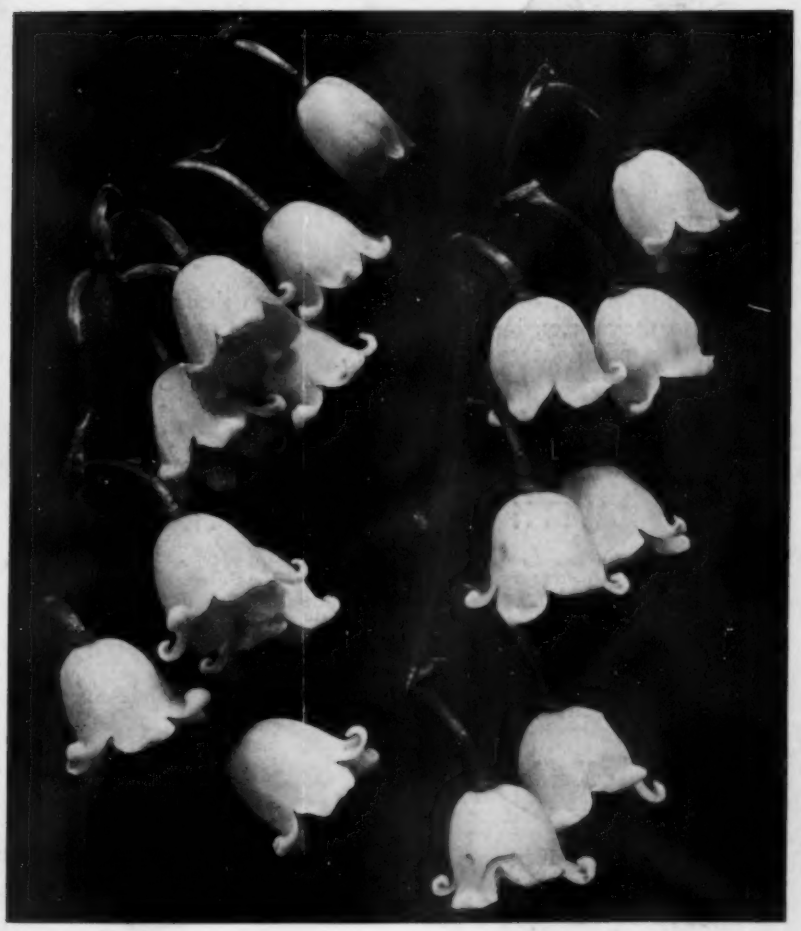
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



APRIL 11, 1936

Resurrection of the Living

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A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

VOL. XXIX No. 783

The Weekly Summary of

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Edited by WATSON DAVIS

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DO YOU KNOW?

Next to rats, field mice do more damage to crops than any other mammals in the eastern United States.

When human beings are very tired or under strong emotional stress, they approach the "animal level of mind," says a psychologist.

Rotten wood is found to be the best diet for termites; and fungi are important to these pests as a source of proteins, and probably vitamins.

Tests of canned pineapple juice showed it to be "a good source of vitamins A and B, a fair source of vitamin C, and to contain a measurable quantity of vitamin G."

A recent survey showed that poor families spend more for food than do those of the middle class, due to poor management and lack of funds for wise and timely buying.

Experiments show that yellow or blue flashlights will drive earthworms back into their holes, but a fisherman who uses a red light to hunt worms will find more worms—they ignore red light.

The house fly thrives in practically any climate in which man lives.

Diseases cause greater loss in poultry than in any other kind of domestic animals.

Wrapping up celery in parchment paper is found helpful in keeping it crisp.

Features of radio broadcasting in Egypt include reading the Koran in the early morning, news broadcasts spoken in Arabic, and programs of Arab music.

In 1935 over 88 million cases of vegetables sold in this country were marked A, B, or C on the labels, to aid buyers in judging the quality.

A meteorologist believes that India's famous religious work, the Rig Veda, was composed 2000 to 5000 B.C., or earlier, judging by many references to climate.

The theory that the famous logs of Arizona's petrified forest drifted there on prehistoric seas is weakened by finding upright stumps with root structure in place in the "forest."

WITH THE SCIENCES THIS WEEK

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PSYCHOLOGY-PHYSIOLOGY

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PUBLIC HEALTH

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PHYSIOLOGY-MEDICINE

New Studies on the Blood Promise Medical Advances

An Extract to Help Save "Bleeders," Instrument to Measure Clotting of Blood Among New Developments

BLOOD featured discussions of the American Physiological Society at Washington. While this may sound as if a gory time was had, no blood was shed.

The discussions were so technical that at times they seemed far removed from the vital red fluid that courses through the arteries and veins of the human body.

Among the many important reports at one session were:

1. An extract from maternal tissue which may help to save the lives of "bleeders," persons suffering from the hereditary disease, hemophilia.

2. A substance in brain tissue and another in the eye which affect the clotting of blood.

3. An adaptation of the photoelectric cell to measure clotting of blood; the new apparatus is called a "coagelometer."

4. Discovery of the primary cause of dangerous blood clots in veins.

5. A method of studying blood regeneration involving total removal and replacement of the blood of dogs and cats.

The extract that may prove valuable in treating hemophilia was obtained from the placenta by Drs. Arda Alden Green, Hope Lowry, R. C. Eley and C. F. McKhann of Harvard University. Dr. McKhann had previously used an extract from this maternal tissue for treatment of measles. The one now reported is a different extract from the same kind of tissue, and seems to have the property of making the blood of bleeders clot more rapidly.

From Cornea

From the cornea of a dog's eyeballs, Dr. John H. Ferguson of the University of Alabama extracted a substance which he found can play a part in the process of blood clotting. This effect of the eyeball tissue indicates, according to Dr. Ferguson, the possibility of preparing a blood-clotting agent from tissues that have no blood in them. The clotting of blood is generally supposed to depend on a substance found in the blood itself. Inability of the blood to clot normally when shed, as in hemophilia, has been thought due to the absence of such substance. He reported other experiments supporting another theory on blood clotting. This is that cephalin from the brain, as well as calcium, is an essential factor in directly activating the clotting substance in blood.

The coagelometer was designed at the Mayo Clinic by Drs. E. J. Baldes and K. K. Nygaard to determine the coagulability of blood in such diseases as hemophilia, obstructive jaundice and thrombocytopenic purpura, in which the blood takes a long time to clot, and in certain cases of thrombosis, or stoppage of a blood vessel by a clot, in which the clotting time is shortened. The coagelometer makes use of the photo-electric cell. Studies with this new tool of modern physics show that there are four and possibly five stages in the process of blood clotting. Clinical application of the coagelometer are under way and will be reported on later.

Clotting of blood within the blood vessels, which may be extremely dangerous, is due primarily to the action of tissue extract, Drs. Stearley P. Harrison and Edward C. Mason of the University of Oklahoma Medical School concluded from experiments they reported at the same meeting. They were able to produce such clots within the veins of an artificial blood-vessel system. Minute amounts of the tissue extract produced the clots when relatively large amounts of blood were circulating through the artificial blood vessels. The clots thus formed were examined under the microscope and found strikingly similar to those occurring in human disease.

The problem of how fast the plasma protein content of the blood supply of the body can be restored to normal after extensive blood loss was investigated by the apparently drastic but harmless operation of removing all the blood and then replacing it by a salt and blood cell mixture, a sort of modified transfusion. In the case of dogs, the plasma protein is regenerated within 200 hours and in cats within 100 hours, Drs. William R. Amberson, John Stanbury and Edna Warweg, of the University of Tennessee and the Marine Biological Laboratory at Woods Hole, Mass., reported.

The operation is performed under ether and the animal suffers no pain or damage. Blood is withdrawn from the carotid artery in the neck. Into the same artery is then injected a salt solution containing in proper proportion the blood cells of another cat or dog. This is continued until examination shows that all the plasma, or liquid constituent of the blood, has been replaced by the salt solution. The rate at which the plasma and its proteins are regenerated is then determined.

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ARCHAEOLOGY

Religious Text Carved in Ice Found in Tibet

"HAIL Jewel in the Lotus"—"Om mani padme hum"—the most popular Tibetan religious formula, has been found many places in Tibet but, strangest of all, an American expedition has discovered it carved in ice.

Brooke Dolan II, who has just returned from Tibet and West China, where he led an expedition of the Academy of Natural Sciences of Philadelphia, found the words carved in an ice bridge on the Upper Yangtze River. (*Turn to next page*)

"OM MANI PADME HUM"

Carved in the icy wastes of the strange land of Tibet was found this devout religious inscription, "Hail Jewel in the Lotus."

Mr. Dolan's journey totaled 5,000 miles by caravan, 2,500 miles by airplane, and 1,700 miles by river.

Ernst Schaefer, of Goettingen University, was zoologist of the expedition.

Among the 3,100 birds and 140 mammals secured is a hitherto undescribed miniature sheep. The most spectacular specimens brought back are wild yak, which inhabit an area never lower than 14,000 feet above sea level, and go with wild sheep as high as 17,000 feet. Big bulls stand six feet at the shoulder and weigh from 1,600 pounds to a ton.

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GENETICS

Biologist Predicts Babies May Come From "Borrowed" Ova

Mother Might Serve Merely as Incubator to Infant From Ideal Parentage; Present Eugenics Condemned

WOMEN having children with neither their own nor their husbands' hereditary qualities—physiologically their mothers, but biologically only their "adopted" mothers—constitute one possibility in a future Utopia sketched by a leading American biologist, Prof. H. J. Muller of the University of Texas, who has for the past three years been carrying on research at the Academy of Sciences of the U.S.S.R. in Moscow, of which he has been elected a foreign member.

This somewhat dizzying suggestion for really radical eugenics is set forth by Prof. Muller in a recently published book, "Out of the Night" (Vanguard Press), which has been in practically its present shape in manuscript form for a quarter of a century, "while the world caught up." Now, Prof. Muller considers publication justified.

There are several developing biological techniques which he regards as promising eventually to make his biological dream a reality. Ovarian tissue might be transplanted from women of extraordinary qualities into prospective mothers of only average hereditary promise, and conception assured through the mechanical implantation of male sex cells from highly gifted men. Or, the ovum might be fertilized outside the body of the mother, and then accepted by her for development and birth. Or the "eugenic" ovarian stock might even imaginably be kept going in incubators, like Dr. Alexis Carrel's famous chicken heart tissue.

This deliberately selective parenthood would have nothing to do with the regular marital life of the commonplace husband and the commonplace wife who would thus "adopt" a baby in the one-cell stage. They would live together, carrying on their normal love-life in the immemorial fashion—but would carefully practice birth-control, to make sure that all their offspring should be of the "thoroughbred" type. Prof. Muller believes that marital love and parenthood need not, and indeed should not, have anything to do with each other.

For eugenics of the type advocated by many sociologists and scientists today, he has only scorn. The measures are only halfway attempts, inadequate even to achieve their limited objectives, he declares. And he even challenges the oft-repeated assertion that the "best stocks" in present-day society should be encouraged into greater fruitfulness. Today's upper classes, he points out, hold their position largely through their success as competitors, as predators. "Eugenics" that would perpetuate a dominantly predatory class, he holds, is really dysgenics.

Prof. Muller won world-wide recognition some years ago by his brilliant researches in genetics, in which he forced the production of new forms, or mutations, by bombarding germ-plasm with X-rays. Election to membership in the National Academy of Sciences of the United States was one of the honors accorded to him at that time.

Science News Letter, April 11, 1936

MEDICINE

New Hormone Promises Help for Diabetics

A NEW hormone from the pancreas which may greatly improve treatment of diabetes was reported by Drs. Lester R. Dragstedt, John van Prohaska and Herman P. Harms of the University of Chicago to the American Physiological Society.

The new hormone, called lipocaic, has not yet been used clinically. It will supplement but not replace insulin. Lipocaic apparently controls the utilization of fat in the body as insulin controls the use of sugar. The diabetic patient suffers from a disturbance in the utilization of fat, so that even with insulin treatment he cannot be returned to a fully normal state. The disturbance in fat utilization often causes a premature hardening of the arteries as well as other difficulties. For this reason the fat in his diet must be more or less restricted.

The new hormone was discovered in studies on dogs. When the pancreas in these animals is completely removed, they cannot live more than two or three months even when given adequate amounts of insulin. At death an extreme infiltration of the liver with fat is found. Giving the new hormone together with insulin, after complete removal of the pancreas, prevented the infiltration of fat into the liver and has enabled the dog to live probably a normal life span.

The Chicago scientists are now trying to obtain lipocaic in pure form.

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GEOLOGY

Greatest Hazard From Meteorite Would Be Hot Air

ARRIVAL of a large meteorite—or perhaps an object like the newly-named planetoid Anteros—would probably do more damage upon the earth through atmospheric disturbance than by seismic shock, according to Dr. Frederick C. Leonard, astronomer in the University of California at Los Angeles. To be sure, a direct hit would wipe out life and property in the line of the collision; but for spectators well to the side the greatest hazard would be that of hot wind, unless perchance the blundering celestial visitor should happen to touch off an unstable rock-fault and produce an earthquake through secondary forces.

New data from explorations in Siberia, published recently by the Society for Research on Meteorites, of which Dr. Leonard is president, reveal details of the terrific blast of hot air which accompanied the great meteorite of June 30, 1908.

If a cosmic mischance had directed the flying planetoid Anteros to earth, friction would undoubtedly have

caused tremendous heating, both of the upper atmosphere and of the planetoid's surface. Much more serious would have been the compression and heating of air ahead of the missile. At the moment of arrival of the planetoid at the earth's surface, this intensely heated air, blocked by the sudden encounter with the nearly incompressible crust of the earth, would be forced out with terrific violence to all sides. The resulting hot wind would doubtless relegate hurricanes and tornadoes to the limbo of mild zephyrs by comparison. One shudders to think of the result had the great Siberian meteorite arrived a few hours later, striking a point in southern Sweden.

Periodic claims by air pilots that they have been compelled to dodge meteors are scouted by Prof. H. H. Nininger, secretary of the aforementioned society, whose data indicate that none of the heavenly missiles came within twenty miles of any aircraft. Furthermore, the normal speeds of ten to fifty miles per second, ascribed to meteors on entering the earth's atmosphere, would scarcely give time for even a trimotored ship to "duck" out of the way.

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PHYSIOLOGY

Ectogenetic Babies Are Still Far from Human Realization

Doctor Gregory Pincus, Who Developed "Unfathered" Rabbit Eggs in Glass, Frowns on Imaginative Hopes

BABIES born in a bottle (or produced "ectogenetically," to use a more learned-sounding word) are still very far from human realization, Dr. Gregory Pincus of Harvard University emphasizes. Dr. Pincus is the young biologist who has created something of a stir even outside biological circles by starting the development of rabbit ova, or eggs, in glass dishes without the intervention of the male elements, or sperm cells.

These "unfathered" rabbit eggs were induced to start the normal processes of division and differentiation by treating them with salt solutions more concentrated than normal blood, and also by heating them to a temperature of 45 degrees Centigrade, which is about 113 degrees on the commonly used Fahrenheit scale. When this treatment was first applied to the unfertilized eggs of such creatures as sea urchins and frogs by Dr. Jacques Loeb, about a generation ago, the resulting "parthenogenetic," or "virgin-born" organisms were the center of a whirl of popular interest comparable only with that aroused by the advent of the Dionne quintuplets in our own day.

But Dr. Pincus frowns upon any tendency to read into his experiments and their results the dreams of such imaginative scientists as J. B. S. Haldane, who predicted that some day babies would be produced in bottles of suitable nutrient fluids outside human mother's bodies. He states:

"Rabbit eggs subjected to the described treatment have behaved as though fertilized, and to date have followed development to early blastocyst stages, both in vitro and in vivo upon transplantation into recipient females after treatment. A more extensive statement is not justified."

Reduced to non-technical language, this means that the chemically or heat-treated rabbit ova have gone through only the very earliest stages of development, either in the glass dishes in the laboratory or when re-introduced into the bodies of "foster-mother" rabbits after suitable preparation. A blastocyst is that early embryonic stage of an organism that consists essentially in a hollow, fluid-filled sphere of cells, only one layer thick. It has as little visible resemblance to a rabbit—or a human baby—as can well be imagined. Yet all living higher animals, including ourselves, were once blastocysts.

Whether mammalian eggs can ever be carried past this blastocyst stage, to eventual birth and full growth, Dr. Pincus is not yet prepared to state. Early stages of growth seem to be fairly easy to start under a number of different abnormal conditions, but mortality is high in all of them—100 per cent. in many. Whether these artificially activated rabbit eggs can eventually be made to leap that lethal hurdle is a question that only further experimentation can answer.

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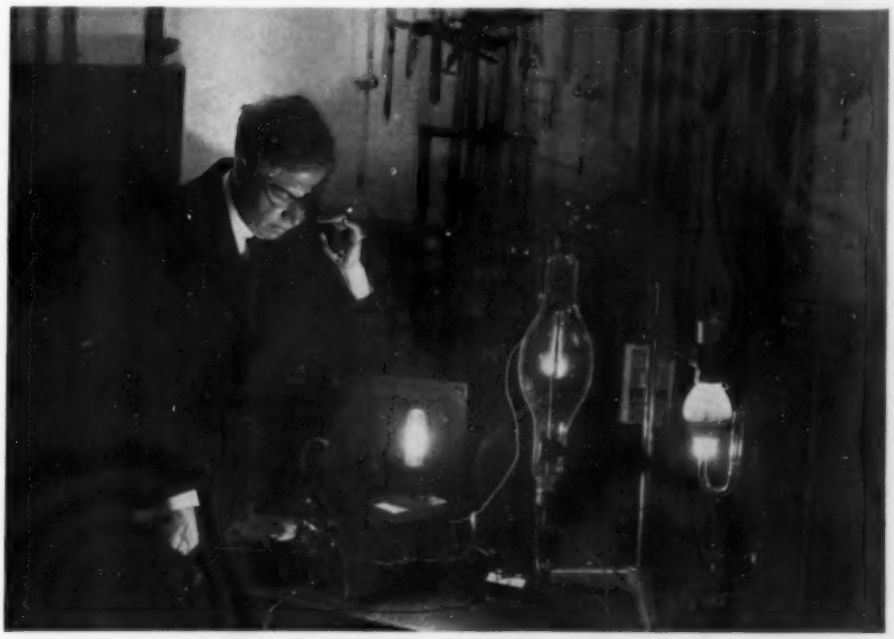

EVOLUTION OF ARC LIGHT

The new "peanut" light (left), developed by the Westinghouse Lamp Company, is claimed to be man's brightest source of light. A small globule of metallic mercury, in a tiny quartz tube about the size of a roasted peanut in its shell, vaporizes when submitted to an electrical discharge, and sets up a brilliant glow of light similar in color composition to that of sunlight. Dr. John W. Marden, Westinghouse research scientist, is comparing its light with that of a replica of the original carbon arc light developed by Sir Humphry Davy in 1813, (center) and a replica of Faraday's original mercury arc light dating back to 1835.

PHYSIOLOGY

Wine Warms Skin of Toes; Coffee Makes It Colder

YOUR big toe is likely to be the coldest or the hottest spot on the surface of your body, with a temperature range of more than 50 degrees Fahrenheit. A drink of wine warms it, a drink of coffee makes the skin of the toe colder. So does smoking.

It may sound like a scientific stunt to measure the temperature of the skin of the big toe or other body surfaces, but the findings are of broad interest to physicians. They were obtained in studies made by Dr. William Bierman at Mount Sinai and Beth Israel Hospitals, New York City. The American Medical Association granted financial aid, and publishes Dr. Bierman's findings. (*Journal, American Medical Association*, April 4.)

Knowledge of skin temperature changes gained from these studies will help the physician to evaluate the effect of medicines, of hot and cold baths, of short wave currents (fever treatment) and of other physical measures used in treating disease.

Among Dr. Bierman's findings are the following:

Nose, ears, fingers and toes are usually colder than the rest of the body, protruding and curved parts being colder at the skin surface than is the torso.

The temperature of the skin is higher over muscles than over bone, over an active organ than over one at rest.

Fat persons have cooler skins than thin ones.

The probable purpose of these marked variations in skin surface temperatures is to keep the temperature of the interior of the body fairly constant. There is a continual balancing of heat production and heat loss.

Some parts of the surface of the body can tolerate heat much better than others, as is well known. The skin of the forehead, of the feet and of the hands can stand more heat than other parts of the skin surface of the body and at the same time actually keeep cooler.

Scientific explanation of this possibly lies in increased sweating of these parts, communication betweeen veins and arteries and the greater number of thermal nerve endings.

A drink of wine causes a warming of the toe surface, it was found. A drink of whiskey causes a faster temperature rise. Coffee makes the skin of the toe colder. With the caffein removed, it produces no change. Smoking also lowers the skin temperature.

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PHYSIOLOGY

Alcohol Harmless to Liver But Excess Increases Its Fat

THE IDEA that alcoholic drinks have a harmful effect on the liver was somewhat "debunked" by Dr. J. L. Bollman of the Mayo Clinic.

With Dr. F. C. Mann, president this year of the American Physiological Society, Dr. Bollman reported studies at the society's meeting showing that alcohol increases the fat content of the liver.

The amount of alcohol which produced this effect in the dogs they studied, however, would be equivalent to a ration of one quart of alcohol a day for a man, Dr. Bollman explained. Furthermore, a fatty liver is ordinarily not harmful, although a large fat content in the liver does make it harder for that organ to cope with what Dr. Bollman termed "further insult" in the shape of certain drugs, or surgical operations.

In previous studies he and Dr. Mann found that the fat content of the liver can be reduced by feeding a diet high in starch and sugar content. This is important in preparing a patient with a fatty liver for surgical operation. It also seems to put a physiological okay on the custom of eating pretzels with beer or sandwiches with cocktails. When questioned about cirrhosis of the liver, a serious condition quite different from fatty livers, Dr. Bollman said he knew of no evidence that alcohol caused the condition.

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EDUCATION

Harvard is Celebrating Its Tercentenary This Year

IN 1636 the general court of the Massachusetts Colony voted 400 pounds toward "a schoale or colledge." First named "Newetowne," the name was changed to Harvard in 1639.

From August 31 to September 12 this year Harvard will celebrate its tercentenary. In honor of Harvard's founding, 75 of the world's leading scientists and scholars will gather at Cambridge in a conference seldom equaled in America in respect to distinguished speakers and the breadth of subjects. Fourteen Nobel Prize winners will be among the persons making addresses, including:

Albert Einstein, physics, United States; Niels Bohr, physics, Denmark; Hans Fischer, chemistry, Germany; Arthur H. Compton, physics, United States; Sir Frederick G. Hopkins, physiology and medicine, England; Robert A. Millikan, physics, United States; Friedrich Bergius, chemistry, Germany; August Krogh, physiology and medicine, Denmark; Thé Svedberg, chemistry, Sweden; Otto Warburg, physiology and medicine, Germany; Karl Landsteiner, physiology and medicine, United States; Hans Spemann, physiology and medicine, Germany; Edgar D. Adrian, physiology and medicine, England; and Werner Heisenberg, physics, Germany.

In the sciences, symposia will be held upon latest researches in mathematics, astronomy, physics, chemistry, geology and biology. But in addition symposia will be held on broad problems which defy a narrowly specialized approach. Thus the symposium, "Factors Determining Human Behavior," will enlist the biological sciences, the social sciences and the humanities.

The remaining symposia, on "Authority and the Individual" and on "Independence, Convergence and Borrowing in Institutions, Thought and Art," will likewise draw from the social sciences and humanities contributions which each discipline can make to two timely and important problems.

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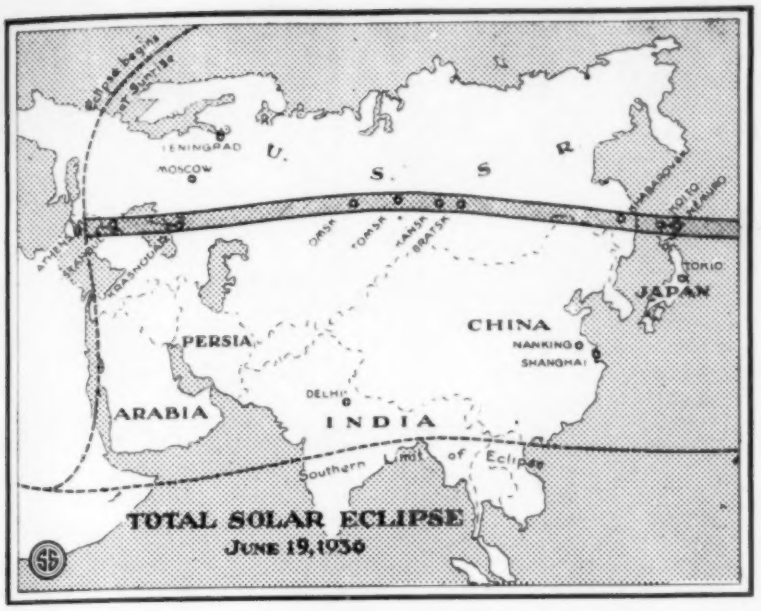

ECLIPSE OF THE SUN, JUNE 19, 1936

Stretching from the shores of Africa clear across Asia to be lost in mid-Pacific is the coming total eclipse of the sun next June 19, 1936. Siberia and the islands off the Northern tip of Japan will be the favorite observation places of astronomers, some of whom will journey half-way around the world to get a two-minute look at the sun while its blazing light is blocked out by the intervening moon.

ASTRONOMY

Astronomers Plan Expeditions To View Total Solar Eclipse

ASTRONOMERS will go to Siberia and to the islands of northern Japan to view the total eclipse of the sun which occurs next June 19. Some of them will journey half-way round the world to watch the sun disappear behind the intervening moon for a time which, at its maximum, is 2 minutes, 31½ seconds.

At sunrise on June 19, inhabitants of Tripoli in northern Africa will see the sun come up black as the moon blocks out its light. At Athens and in Asia Minor the sun will rise in normal fashion but within a few seconds will be obscured.

Thus onward with a speed that covers nearly half the world's circumference in the daylight hours, the shadow cast by the moon on the earth will sweep, across the Black Sea, the southern Ural Mountains, across the steppes surrounding Orenburg and into Siberia. There it sweeps across thousands of miles to the islands on the northern tip of Japan, until it finally ends far to the east in the vast expanse of the Pacific Ocean.

Starting comparatively narrow, the path of totality gradually widens, and the time the sun is obscured lengthens, until at the northern end of Lake Baikal at 12:30 p.m. on June 19 the path is 82 miles wide and the eclipse will last just a little more than 2½ minutes.

From Lake Baikal eastward the path of totality narrows again and the time of totality shortens.

As always, astronomers are wondering whether the sky will be clear at their chosen observation points after they have traveled for thousands of miles with bulky and heavy equipment.

Prof. S. A. Mitchell, of the University of Virginia, who is president of the Eclipse Commission, International Astronomical Union, estimates that the chances of clear weather throughout the eclipse track are about fifty-fifty. Where American eclipse parties will observe, however, the chances are slightly better; 60 per cent. in favor of clear weather. Since 1933 the Soviet government has collected all the available weather information old and new on the climatic conditions of the various possible observation points.

The largest American party will be the joint Harvard University and Massachusetts Institute of Technology expedition headed by Dr. D. H. Menzel and Dr. J. C. Boyce. They will be located at Ak-Bulak, which is not far from Orenburg, just west of the southern limits of the Ural Mountains.

The joint expedition of Georgetown University and the National Geographic Society, headed by Dr. P. A. McNally, S.J., will be stationed at Kustanai, about 500 miles east of Orenburg and just east of the southern tip of the Ural mountain range.

Dr. Willi Cohn of the California School of Fine Arts will be in northern Japan with Japanese expeditions, as he was in the 1934 eclipse which occurred in the South Seas. Dr. Cohn will cooperate with Science Service in reporting the eclipse conditions from that point.

England will send two expeditions into the eclipse area, under the auspices of the Royal Society and the Royal Astronomical Society. At Omsk will be the party of Prof. J. A. Carroll of the University of Aberdeen.

A larger British party will be at Kamishari in Hokkaido, the northern island of Japan, where Prof. F. J. M. Stratton of Cambridge University will be in command.

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SEISMOLOGY

Severe Earthquake In Celebes Sea

THE BED of the Celebes Sea, south of the Philippine Islands, has been shaken by a heavy quake, reports of eleven seismographic stations indicate on interpretation by the scientists of the U. S. Coast and Geodetic Survey. The reports were transmitted through Science Service.

The shock occurred on the night of Tuesday, March 31, at ten minutes after nine o'clock, Eastern Standard Time. The epicenter, or point of greatest surface disturbance, was approximately in latitude 3 degrees north, longitude 124 degrees east.

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Gold is alloyed with baser metals, but platinum is usually alloyed with a still more precious metal, iridium.

GEOLOGY

Airplanes to Search for Siberian Meteorite

AIRPLANES will attempt to find the great meteor whose fall in 1908 in Siberia felled a forest, burned an area over 35 miles in length and caused an earthquake.

The meteorite commission of the U.S.S.R. Academy of Sciences has announced its determination to continue the search until this meteorite, considered the largest known in history of mankind, is actually found in the Siberian valley of the Podkamennaya Tunguska river.

All attempts to find the meteorite, undertaken during the past few years by a staff member of the Academy, L. A. Kulik, have so far failed. This year, the study of the area of fall will be made from airplanes. It is believed that a photo taken from an airplane in the spring when the snow vanishes and the woods are still bare, will show both the direction in which the trees fell, when swept by the fall of the meteorite, and the craters formed by the impact of the meteorite which apparently broke into several pieces during the fall.

Science News Letter, April 11, 1936

GENERAL SCIENCE

More Government Research Would Help Unemployment

ADEQUATE and generous support of basic research in physics and chemistry is of outstanding economic importance to the nation as a foundation for the further development of industry and commerce in the nation, declared Dr. Lyman J. Briggs, Director of the National Bureau of Standards, before The Franklin Institute.

"One new industry comparable with the automobile industry," said Dr. Briggs, "would bring employment back to normal. The same thing could be accomplished with a number of smaller industries of equivalent output.

"To increase employment," he added, however, "these new industries must do more than replace with a new product something already in use. They must create new things that people will want in addition to what they already have."

Basic research in physics and chemistry, Dr. Briggs indicated, is the way to find these yet-unknown industries. Moreover, if industry is to provide a wider field for employment there must be some source of new basic knowledge to provide new facts and discoveries with which to work.

"Viewed from this standpoint," he maintained, "basic scientific research may play an important part in our national development, as a catalyzer of new industries and a stabilizer of economic tides. Is not its generous support by the Federal government warranted as a sound economic measure?"

Dr. Briggs urged that basic research in physics and chemistry be supported as is agricultural research. In the latter science over $21,000,000 a year is appropriated by the Government for research and the new 1935 act authorizes eventually an additional appropriation of $5,000,000 a year for basic agricultural research. Commented Dr. Briggs:

"Industry as well as agriculture is a factor in our national welfare. Both deserve the assistance of the Government in carrying out the basic research necessary for their development."

Science News Letter, April 11, 1936

PUBLIC HEALTH

Air "Mask" Protects From Dust, Gas, Smoke

AN AIR "mask" which would provide the rock driller, painter or chemical worker with fresh air and protect him from poisonous gases, smoke and dust while leaving eyes, nose and mouth free is described in a U. S. patent (No. 2,032,101) granted to W. D. Sullivan of West New York, N. J. The mask is literally a film or curtain of air completely covering the user's face.

Intended to perform the duties of the conventional gas mask, the novel air mask is produced by an eyeshade-like shield worn on the forehead. The visor of the shield contains an air chamber, provided with numerous outwardly slanting openings at its lower edge. When air under pressure is forced into the chamber, streams of the air issue outwardly and downwardly from these openings to form a transparent air screen or curtain completely covering the face, but spaced away from it.

With such an air film for protection, the user could pass through dust, smoke, gas, and paint fumes without any of these coming in contact with his face. The inventor further claims there would be no trouble in breathing and seeing.

Science News Letter, April 11, 1936

IN SCIEN

PHYSIOLOGY

New-Found Gland Reaction Mobilizes Body's Forces

THE BODY has a special general alarm call by which it mobilizes, within forty-eight hours, its defensive forces against poisons and other damaging influences. Evidence of this hitherto unknown defense reaction was presented by Dr. H. Selye of McGill University, Montreal, to the American Physiological Society.

The "general alarm" involves three glands and may be due to a new adrenal gland hormone. The regiments of defense called out by the alarm, however, are located in the thymus gland, an organ in the chest which is large in children but grows smaller and may almost disappear with age.

The newly discovered defense action is like the immune reaction by which the body fights invading disease germs. But it is much faster and operates against poisons and other injuries as well as against germ infections. The routine of general alarm reaction consists of overactivity of the adrenal and thyroid glands, involution or shrinking of the thymus gland as it sends its regiments into the battle, and certain changes in the body's use of water. The reaction fails to occur when the adrenal glands are missing. It is not due to adrenalin, one well-known adrenal gland hormone, nor, apparently, to the other adrenal gland hormone, cortin, Dr. Selye's researches indicate.

Science News Letter, April 11, 1936

ENGINEERING

Industrial Research Men To Get Franklin Medals

INDUSTRIAL research has been recognized in the selection of this year's two recipients of the prized Franklin medal of the Franklin Institute. Dr. Frank B. Jewett, director of the Bell Telephone Laboratories, Inc., and Dr. Charles F. Kettering, director of the General Motors Research Laboratories, will receive the 1936 awards on May 20.

Science News Letter, April 11, 1936

NE FIELDS

BOTANY

Wheat Crossed With Quack Grass Makes Good Bread

QUACK grass, hated in this country as a noxious weed, has been hybridized with wheat by a Russian plant breeder, Dr. H. B. Tzitsin, the Tass Agency in the United States has been informed. The new grain grows perennially, like its quack-grass parent. This would presumably give it the double advantage of not having to be sown every year, and of covering and binding the soil against erosion with a continuous mat of roots.

Small-scale experiments with the hybrid grain indicate that it will yield more flour, bushel for bushel, than "straight" wheat. Bread baked from the hybrid grain flour is said to be of good quality and flavor.

Another of Dr. Tzitsin's hybrid wheats combines four wheat varieties in its pedigree, and is declared to be a phenomenally heavy yielder, one stalk producing as many as 400 grains. Still another hybrid wheat has been evolved for growing in the short-summered North; its grain can be matured in as little as 67 days.

Science News Letter, April 11, 1936

MEDICINE

Study Shows Effects of Radium or X-Ray on Cells

STUDIES which may explain some of the varying results obtained in the treatment of cancer by X-ray and by radium were reported by Dr. Shields Warren of Boston at the meeting of the American Society for Experimental Pathology.

Dr. Warren observed the way in which cells of a strain of rat cancer divided following exposure to radium of the same dosage as is used in the treatment of human cancers. He found marked variation in the way the dividing cells of the cancer responded to the irradiation.

Body tissue, both cancerous and normal, grows by process of cell division. In the case of cancer, however, the growth continues unchecked, the cancer cells overrunning the normal ones. Irradiation, either with X-rays or radium, is of benefit in cancer because it checks the process of division by which the cells grow, finally destroying the cells.

In the rat cancer cells Dr. Warren observed that the frequency of division dropped rapidly within an hour and a half after application of the radium, reaching its lowest point during a period from two to ten hours after irradiation. The cancer tissue then recovered partially, the cells dividing at about one-third their previous rate. This level continued for about 72 hours. From ten hours onward, the cell division shows numerous cases of abnormality.

Science News Letter, April 11, 1936

ARCHAEOLOGY

Prehistoric Peoples Liked Strong Beer

BEER with a solid, authoritative "kick" was favored by prehistoric peoples in Germany, probably as much as it is nowadays. Evidence supporting this idea has been found in a number of ancient drinking-vessels examined by Prof. Johannes Grüss, veteran Berlin microscopist who can tell what a man drank ten thousand years ago by examining the dried dregs left in the bottom of his drinkng-horn or bowl. (*Forschungen und Fortschritte*, Mar. 20.)

In several ancient beer vessels, found in various parts of Germany, Prof. Grüss has discovered the mixture of fragmentary starch grains and yeast cells that always spells beer. With them were numerous pollen grains from honey-producing flowers. This, Prof. Grüss says, is always an indication that honey had been added to the beer while it was brewing, to give the yeasts a more concentrated sugar solution to work on, and thus produce a higher alcohol content.

The ancients in what is now Germany were not bothered with the modern brewmaster's passion for "pure cultures." The relics of fermentative organisms found by Prof. Grüss are an exceedingly miscellaneous mixture: several different kinds of yeasts, numerous species of bacteria, molds and other genera of fungi, even cast skins of a few of the lower animal forms. The old-timers apparently drank for effect, and didn't mind what was in the dregs.

Science News Letter, April 11, 1936

MEDICINE

Cancer Cells Not Sick, But Healthy and Vigorous

CANCER cells are not sick or diseased even though they cause illness and even death. Instead, Dr. Warren H. Lewis of Baltimore, Carnegie Institution researcher on cells, calls them "extraordinarily healthy and vigorous."

Arising from perfectly normal cells, the cells of a cancer become a new type or species, Dr. Lewis' researches show. The change occurs because of the changed environment in which the cells live, sometimes a chemical causing the cancer to form.

The idea that cancer is necessarily associated with viruses, such as cause some other kinds of diseases, is discounted by Dr. Lewis in his lecture-report to the Carnegie Institution of Washington.

Dr. Lewis has concluded:

The cells of these tumors are easily recognizable when grown outside the body. They are different from normal cells. There are a number of different cell types in these chemically induced tumors. They apparently breed true to type. The same type of cell can be recognized in cultures from serial transplanted tumors for generation after generation. All traces of the chemical which caused the original tumor soon disappear from these later generations of cells descended from the original tumor cells.

"The most characteristic property of malignant cells is their uncontrolled multiplication in the body," Dr. Lewis pointed out. "All normal cells are under control of some sort. The nature of the control mechanism is obscure but fundamental for all multi-cellular organisms. It begins at the two-cell stage and continues throughout life. It is inherited. New types of cells like the malignant ones have no natural place in the animal organization, hence it is not surprising that they are not subject to the same laws of control as normal ones."

Dr. Lewis, in discussing tumors that may be produced by viruses, said:

"A sharp line of distinction can be drawn between the true tumors on the one hand and the bacterial and virus tumors on the other because the continued presence of the causative agents is probably necessary for the growth of the latter."

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BIOLOGY-CHEMISTRY

Chemist Extraordinary

Tiny Bacillus, Visible Only Under the Microscope, Can Perform Feats Impossible to Best Trained Man

By JANE STAFFORD

SUPPOSE you were given some glycerine, water, a few chemical salts, including one from asparagus, and a citrate. What could you make out of them? Not very much, even if you are a trained chemist.

From those same substances, the tuberculosis "germ," the tubercle bacillus to scientists, so small you cannot see it without a microscope, makes dozens of highly complicated substances. Among them is an acid that is absolutely unique and which is largely responsible for the germ's ability to cause disease in man and other animals.

"The tubercle bacillus is a better chemist than I am," Prof. R. J. Anderson of Yale University told me. Prof. Anderson is no mean chemist himself. He has spent nine years learning the secrets of the tb germ's chemical factory.

He showed me 170 tubes of chemicals, most of them different substances which the germ builds up by its skillful chemistry, but he says he and his colleagues have "only scratched the surface."

The tubes he showed me in his laboratory at Yale were exhibited to medical scientists at the Washington meeting of the Federation of American Societies for Experimental Biology.

Some of these chemicals of long names and complicated structure are of utmost importance to you and me. They are the means by which the tubercle bacillus, when it gets into human bodies, causes tuberculosis.

Dangerous Research

That is the reason behind Prof. Anderson's long years of tedious, painstaking and even dangerous research. (Dangerous because Prof. Anderson and assistants have handled many pounds of tb germs that were alive and ready to strike back with disease and death if given the slightest chance.) To go back to the reason for his research: Medical men know they can hold tb in check by hygienic measures—good living and working conditions, food and rest—and by measures that block the spread of the germ from sick to well.

They want more specific, deadly sure weapons against the disease. A good way to get such a weapon is to probe the inmost secret living processes of the germ and find just what poison it uses to spread disease in healthy bodies. A few attempts had been made at this tb germ-probing in the past. They failed to reveal much. Members of the National Tuberculosis Association's research committee, headed by Dr. William Charles White, U. S. Public Health Service, decided to marshal all the forces of medical science in a drive on the tb germ.

The first step was taken in biological laboratories where huge quantities of the germs were grown under exactly similar conditions and on exactly similar media—the glycerine-water-salt mixture from which the germs get the raw materials for their life processes.

Thousands of Quarts

Thousands of more than quart-size flasks of these living germs were sent to the Yale University chemical laboratories. There a systematic chemical analysis was made of the germs. It is the first such systematic chemical examination of the tb germ ever made anywhere in all the long history of man's fight against the white plague.

Taking great care not to injure or destroy the active principles of the germs, the Yale chemists proceeded to extract by simple neutral solvents the three chief chemical groups: proteins, carbohydrates and lipoids or fats contained in the living germs. Prof. Anderson, with the aid of Drs. E. G. Roberts, E. Chargoff, M. L. Burt, M. C. Pangborn, N. Uyei, M. S. Newman, J. A. Crowder and F. H. Stodola, have spent nine years analyzing just the lipoid or fatty fraction part of the germ.

The proteins and carbohydrates of the tb germs were analyzed similarly by another group of chemists headed by Prof. T. B. Johnson of Yale University with the aid of Drs. R. D. Coghill, E. B. Brown and A. G. Renfrew, and by Prof. M. Heidelberger of Columbia University. Very minute amounts of both protein and sugar which the tb germ produces will kill an animal sick with tuberculosis within a few hours, but this discovery is another part of the story.

One reason it has taken so long to make the analyses is that new methods had to be developed.

Working with the fatty part of the germs, Prof. Anderson first split this, chemically, into simpler chemical units. Then he worked at each of these units in turn, splitting or breaking them down into more and more units. Each unit was studied to determine what chemical elements it was made of and how these were put together. In some cases, the chemists took from their shelves the same elements and combined them to produce synthetically the units they were finding in the tb germ.

Important Acid

Most important of all these substances, is phthioic acid. (Pronounced tie-oh-ick.) Prof. Anderson gave it that name because the old name for tuberculosis of the lungs or consumption was the Greek-derived word, phthisis. This acid is characteristic of the tb germ and some of its germ-relatives. Some of the other chemicals Prof. Anderson obtained from the germs are found in other living organisms. Phthioic acid, however, is a special acid found only in the tb germs.

This acid all by itself can produce in the body the nodules of cheesy tissue known as tubercles, characteristic of the disease, tuberculosis. This was discovered in tests conducted by Dr. Florence Sabin at the Rockefeller Institute for Medical Research, New York City. One cannot say, however, that this acid produces the disease, since in the absence of living tb germs, there is no spread of tubercle formation throughout the body. Other chemical fractions of the germ can also cause tubercle formation in the body, but phthioic acid has the greatest activity along this line.

The picture of sickness which we know as tuberculosis is produced by the continuous manufacture by living germs within the human body of these chemical poisons; first, phthioic acid; then the poisonous sugar; finally the poisonous protein. It is in the hope of finding substances to neutralize these

MADE BY A GERM

From the chemical "factory" of the tubercle bacillus, come a poisonous sugar, a poisonous protein, and the unique acid that produces tubercles all by itself. Prof. R. J. Anderson, of Yale University, (right) is showing Dr. William Charles White, of the U. S. Public Health Service's National Institute of Health, the tubes containing the first chemical fractions extracted from the TB germ. Each of these in turn was subjected to further extraction, and each fraction again extracted, until now Prof. Anderson has nearly 200 such tubes.

poisons that the research headed by Prof. Anderson is going on.

Dr. Anderson also looked for the chemical that gives the tb germ its reddish-brown color. He finally extracted this substance in the form of yellow crystals to which he gave the name phthiocol. There is only a tiny amount of this in the germ, but it probably plays a very active part in the germ's breathing process. From pounds of tb germs Dr. Anderson extracted what amounts to a good-sized pinch of the crystals, and this tiny bit represents the world's supply of natural phthiocol, outside of what is in living tb germs.

This phthiocol which has a very long chemical name had never before been found anywhere until Dr. Anderson discovered it in the tb germ's chemical factory. Shortly following the discovery of phthiocol the Yale chemists were able to prepare the substance in the laboratory by two different chemical methods, starting from the coal tar products, methylnaphthalene and naphthalene.

Within a year of the discovery of phthiocol two other methods of synthesizing it were described by other chemists while working on entirely different research programs. A Spanish chemist prepared the substance in the course of his investigation of plumbagin, the active principle of leadwort, and a chemist in Brooklyn, N. Y., prepared it by the careful gradual oxidation of lapachol, a compound found in the wood of the African lapacho tree.

The tb germ also makes a peculiar and characteristic sugar by the name of d-arabinose. Arabinose is universally distributed throughout the plant kingdom, but it is l-arabinose. The letters signify the way the chemical affects polarized light, a complicated matter of interest chiefly to chemists. The tb germ is unique in producing d-arabinose.

This sugar by itself is harmless, but the tb germ combines it in a peculiar way with other harmless sugars to make its own complex sugar that is deadly poison to a tuberculosis-infected animal.

These findings of Dr. Anderson's pertain not only to the germ of human tuberculosis. There are other, related germs that cause tuberculosis in cattle and in birds. A third relative of the tb germ is a harmless organism known as the timothy bacillus. Also related is the leprosy bacillus. Each of these organisms has been analyzed in the same way, and most of the chemicals found in one were found in another, though in varying amounts.

Prof. Anderson is still busy analyzing the tb germs and expects to find more products of its chemical factory. Some may be even more significant.

ARCHAEOLOGY

Jerash Had Traffic Rules And Parking Lot in Forum

IS JERASH mentioned in the Bible? "It is and it isn't," answers Dr. W. F. Stinespring, archaeologist.

Young Dr. Stinespring has been asked that question so many times since he went to dig at ruins of the city of Jerash, or Gerasa, for Yale and the American School of Oriental Research in Jerusalem.

Whether you can find Jerash in the Bible depends on the version you consult, Dr. Stinespring explains. You have to look for the story of Christ healing two men possessed of evil spirits, with the dramatic ending of the spirits entering a herd of swine and running headlong into a lake. In some Bibles it is reported to have happened at Jerash, then called Gerasa. Another version places it 30 miles away at Gadara.

The Jerash of Roman days, about the time of Christ, was a typically Roman planned town—main street lined with columns running one way, and principal cross streets running the other.

There are mysterious ruts in this main street, Dr. Stinespring told the Archaeological Society of Washington, describing the latest finds. In the well-laid Roman paving these deep ruts were worn along the right side of the road—never the left. Traffic rules, whatever they were, evidently were obeyed.

A Parking Lot?

Some of the graceful columns encircling the oval forum of Jerash are still standing. But what the forum was used for, whether a meeting place, market dealings, or official business, is uncertain. One theory has it that merchants, coming over the dusty caravan routes, "parked" their camels in the forum and tidied themselves up before going into town. The stone pavement of the forum is so solid, where it has been uncovered by the archaeologists, that Dr. Stinespring says it would make an excellent parking lot for automobiles.

Jerash had a beautiful and impressive triumphal arch built in honor of the visit of the Emperor Hadrian himself. That visit was a great event. Jerash had a large *circus maximus* like that at Rome, but archaeologists believe this was not finished because of a financial depression.

(*Turn to next page*)

A glimpse of theatrical lighting effects, as they were designed in Roman days, is offered at ruins of a Jerash theater. The plays must have been given in daylight, with little chance for artificial lights, Dr. Stinespring explains. But the stage was built with pink limestone columns, and when sunset spreads rosy colors over this stage, even a person sitting in the wreck of the tiers of seats can imagine the beauty at the close of a performance.

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PSYCHOLOGY-PHYSIOLOGY

Brain Waves New Tool for Watching Workings of Mind

Learning Can Be Observed by Psychologist Through Tapping Electric Impulses Direct From Brain

TAPPING of electric potentials, or "brain waves," directly from the brain now gives the psychologist a new tool for the study of what goes on in the mind of man, including the higher thought processes, it is suggested by Dr. Herbert H. Jasper, psychologist of the Emma Pendleton Bradley Home, East Providence, R. I., and Brown University.

If you look at a red light shining in a darkened room and then that light is put out, you will continue to see the light for a time as an "after-image." In the past, psychologists have been able to study such after-images only through the description by the subject of what he saw. Now the brain waves give a new and independent verification.

When nerve impulses go to the brain from the eye or the ear, they do not find a nice quiet group of brain cells awaiting their coming to be set into activity, Dr. Jasper has found.

"These cortical cells seem to have a vigorous activity of their own, but evidently not enough to discourage always the sensory impulses, for they may jump right in and either abolish completely the cortical rhythm or distort it beyond recognition by causing it to behave in a very different manner," he said.

By watching the record of the brain waves, the psychologist can tell when the subject is seeing the light and how long the after-image persists. When a flickering light is used, he can tell exactly how fast the light may flash and not appear to the observer as a continuous beam.

The process of learning may be "watched" in the brain. For example, a faint sound does not ordinarily produce the upsetting effect on the brain waves that is produced by a bright light. But when the faint sound and the bright light are associated together, the faint sound may come to have a similar blocking effect on the brain waves. The psychologist watching the brain wave patterns can tell exactly when this learning, or "conditioning" takes place.

A change in "mental set" of the observer may make the bright light cease to block the brain waves, or it may cause the faint sound to become as effective as the light ordinarily is, Dr. Jasper found.

"Even though we are able to tap only certain aspects of the bioelectric activity of a few cortical regions," he concluded, "we are certainly obtaining an important objective record of the effects of sensory stimulation which bear significant relations to what psychologists have discussed formerly under the rubric of the conscious mental processes."

Thus the brain waves open up an entirely new technique for the scientist who wants to study objectively and scientifically the processes known formerly only by subjective report.

Dr. Jasper recently described the new applications of the brain-wave technique to the New York Academy of Sciences.

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In museums of the world there are now 150 of the painted coffins of Egyptians inscribed with religious thoughts 4,000 years old.

The house of the future may have glass walls and marble windows, now that research has developed glass building blocks and marble that is translucent like stained glass.

MEDICINE

Remedy for Cystitis May Come From Insecticide

A LABORATORY-MADE insecticide powder which may turn out to be a valuable remedy for bladder disease was reported to the American Society for Pharmacology and Experimental Therapeutics. The report was made jointly by Drs. Floyd DeEds, John O. Thomas, C. W. Eddy and A. B. Stockton of the U. S. Department of Agriculture and Stanford University Medical School.

The powder, which has the name phenthiazine, was made in the Department of Agriculture laboratories for use as an insecticide. Before it was put into practical use for this purpose, it was tested on animals to determine whether it was poisonous. Its effect on these animals indicated a possible use as a urinary antiseptic.

Rabbits suffering from cystitis or bladder inflammation due to infection with colon bacilli were cured by the addition of small amounts of the powder to their diet.

Encouraging Results

Encouraging results in about thirty human cases of chronic cystitis were obtained with phenthiazine. In these thirty cases every kind of treatment had failed to relieve the condition. With proper scientific caution, however, the investigators point out that the new antiseptic is still in a very experimental stage and far from being ready for general application in the treatment of human disease.

A plentiful supply of the antiseptic will be available as a result of laboratory synthesis made recently.

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PSYCHIATRY

New Organization To Study Suicide

THE CAUSES and ways of preventing suicide will be the subject of study by an organization just chartered in New York State, according to an announcement in the professional journal, *The Psychological Exchange*. The organization is aided financially by Marshall Field and others. It has a staff of seven psychiatrists and two social workers who will make researches and spread information on this subject.

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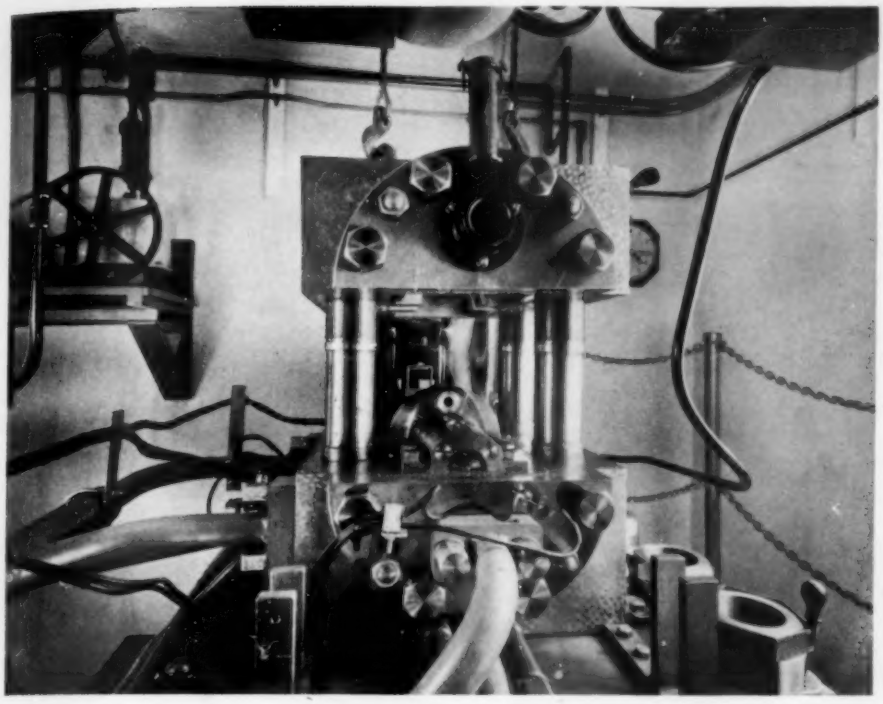

ULTRACENTRIFUGE

This apparatus, which whirls solutions with forces equal to 250,000 times the force of gravity, is now in use industrially by the du Pont company. For the photograph, the upper part of the housing has been removed to show the rotor, cell chamber and end of bearing.

ARCHAEOLOGY

Spotlight Focusing on Mayas; Great Discoveries Expected

THE SPOTLIGHT of discovery is focusing on the land of the Mayas. It looks as though news of ancient America's greatest civilization would break there soon.

An expedition is already digging in the very region where the most learned students of America's past have pointed, as the likely birthplace of the magnificent Mayan civilization. And that is in the highlands of Guatemala, south of Mexico.

Expeditions heretofore have unearthed ruined cities of the Mayas in jungles of Yucatan and Guatemala. They have revealed these ancient Indians as master builders, astronomers, mathematicians, and inventors of a writing system. Belated respect is paid the Mayan calendar. It was more accurate than the calendar of Spain, when the Spaniards arrived in America and set about civilizing the benighted savages.

But what has baffled science is to explain when and where so extraordinary a civilization got its start.

So, the expedition of the Carnegie Institution of Washington, which has launched on a campaign to explore mounds in the highland region, in the suburbs of Guatemala City, is being closely watched.

It was in the hill country, by the generally accepted theory, that the Mayas or their forefathers learned to plant corn. And when they became stable farmers, then their star rose and they began to build massive temples to the gods and to practice the arts and sciences.

At the site chosen for digging, discoveries have already been reported by Dr. A. V. Kidder, expedition leader. A stucco pyramid, three times rebuilt, and tombs containing pottery of great interest, are the initial finds. How old will the site turn out to be?

Potsherds found at the same site some years ago were hesitantly pronounced "early." Since then, archaeologists have accumulated more knowledge for establishing the antiquity of Mayan remains, as far back as the history has been pushed. The oldest known Mayan city, Uaxactun, goes back to several centuries before Christ.

Before the present expedition began its work, Dr. Kidder summed up the strategic importance of the highland impressively in these words:

"The significance of the Guatemala highlands can hardly be overestimated, for in the mountain valleys should be found the remains of the early groups whose culture, according to the hypothesis held by most authorities, either through movement of people or by diffusion, fathered that of the Maya."

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PHYSICS

Powerful Ultracentrifuge Is Built Commercially

NEW RESEARCH equipment which whirls solutions with such velocities that the centrifugal forces developed are equivalent to 250,000 times the force of gravity has just been installed at the du Pont Experimental Station, Wilmington, Delaware.

The apparatus, known as an ultracentrifuge, works on the same principle as the old-fashioned cream separator. High speeds of revolution, however, make the device capable of creating forces so powerful that molecules and sub-microscopic particles can be separated out of their solutions.

The high-speed rotor of the ultracentrifuge is revolved by a turbine driven by a blast of oil. At the normal operating speed of 60,000 revolutions a minute the tip of the rotor is moving with a velocity of 1,200 miles an hour; this is one and one-half times the muzzle velocity of a 22-caliber rifle bullet.

The device is a commercial adaptation of the apparatus first developed by the Swedish scientist, Prof. Thé Svedberg who won the Nobel Prize in Chemistry in 1926.

Prof. Svedberg has been able, in his laboratory models of the ultracentrifuge, to obtain rotor speeds of 160,000 revolutions a minute and create forces equivalent to 1,100,000 times that of gravity. (*SNL*, Aug. 4, 1934.)

In America at the University of Virginia, Prof. J. W. Beams and his co-

workers have developed small ultracentrifuge mechanisms that are air-driven and create centrifugal forces equal to 7,000,000 times the force of gravity. (*SNL*, Nov. 30, 1935.)

The du Pont apparatus, built by Dr. J. B. Nichols, who studied under Prof. Svedberg when the Swedish scientist was visiting professor of chemistry at the University of Wisconsin, is the industrial outgrowth of these laboratory developments.

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ENGINEERING

One-Man Can Operate Motion Picture Theater

A ONE-MAN motion picture theater, which could be completely operated by a single attendant, including ticket selling, the making of change, taking the admission fee, and working the projecting machine is described in a patent (No. 2,032,410) granted to A. N. Goldsmith, of New York City.

By a novel arrangement, the conventional ticket booth would also become the projecting room in which one person could run the whole "show." Use of fire-proof film would eliminate the fire hazard. The film would be of small size so that a complete two-hour show would be contained on a single reel. This eliminates the need for two or more projecting machines usually required where larger film is used, says the inventor.

The two-in-one booth is for use only in the "little theater" or small theater of restricted seating capacity, which charges but a small admission fee. It apparently is not intended to compete with or replace the regular motion picture theaters. The patent has been assigned to the Radio Corporation of America.

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BOTANY

NATURE RAMBLINGS by Frank Thone

Hoarders of Life

See Front Cover

VIOLETS, buttercups, spring beauties, trilliums, Jack-in-the-Pulpit, Solomon's seal, May-apple, Lily-of-the-valley, bloodroot, blue-eyed grass, Dutchman's breeches—these and a host of other lovely blossoms we instantly hail as gifts of spring. In a way they are, for they come to us in April and May—a few of the most daring in late March—and may therefore be called the gifts of spring as justly as Christmas presents or birthday presents are assigned to their particular anniversaries.

But Christmas and birthday gifts are prepared in advance of their presentation, and so also are the spring flowers. With hardly an exception, the flowers that star the woods just before and after Easter were prepared for our present delight during the summer that is past. They were paid for out of savings thriftily laid by during a former time of abundance. Their resurrection from seeming death is really just a continuation of a life that is, in a wholly simple and natural sense, everlasting.

Examine the underground parts of any one of the flowers named, or of almost any other spring flower you can find, and you will see a thickened root, or rootstock, or bulb, or corm, or some other form of "storage organ," filled with starch like a potato or with sugar like an onion. This was formed out of the surplus food manufactured by the plant last summer—sometimes during several summers—when no flowers were in sight or immediate prospect. All winter through it lay under ground, compact energy of the sun fixed and hidden away, ready to be liquidated when the returning warmth and light of that same sun should give the word this spring.

Summer flowers, many of them, will be different. There will, of course, be plenty of perennials, long-lived and food-storing plants, among them, but summer plants also include many annuals, plants that grow during one season from seed, form seed for the next year, and then die when frost comes. The longer time they have before their flowers become mature gives opportunity for this short life cycle to complete itself and still leave next year's generation provided for in the scattered seeds.

Of course, the perennials par excellence are the trees, for these store their food in the exceedingly tough and long-lived wood of trunk and roots. It is for this reason, presumably, that most trees —alder and willow, maple and oak, dogwood and redbud, magnolia and tulip-tree and a host of others—are as truly spring flowers as are violets and buttercups.

The enlarged photograph of lily-of-the-valley that appears on the cover of this issue of the SCIENCE NEWS LETTER is by Cornelia Clarke.

Science News Letter, April 11, 1936

Complete architecture of a pharaoh's palace in Egypt is laid bare for the first time by excavations at Thebes by the Oriental Institute of Chicago.

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RADIO

April 14, 3:15 p.m., E.S.T.

CRIME LABORATORIES—Dr. Wilmer Souder of the National Bureau of Standards.

April 21, 3:15 p.m., E.S.T.

THE TB GERM—POISON FACTORY—Dr. William Charles White, National Institute of Health of the U. S. Public Health Service.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

*First Glances at New Books

Biology

EVOLUTION—A. Franklin Shull—*McGraw-Hill,* 312 p., $3. A modern text on evolution, by one of the leading biologists of this country who also knows how to teach, this new book will doubtless live through many editions. It assumes a knowledge of elementary biology on the part of the reader, yet avoids overloading him with unnecessarily technical discussion. Considering the number of still-vexed questions that have to be taken up in any complete general treatise on evolution, it is remarkable how the author has kept his book from growing out of all bounds. An excellent economy of words, that nevertheless avoids dryness and sparseness, is largely responsible for this achievement.

Science News Letter, April 11, 1936

Mathematics

EXPOSÉS DE GÉOMÉTRIE: INTEGRALGEOMETRIE—Wilhelm Blaschke, 22 p., 7f; LE PROBLÈME DE LA DÉRIVÉE OBLIQUE—G. Bouligand, G. Giraud and P. Delens, 78 p., 18f.—*Hermann & Cie., Paris.*

Science News Letter, April 11, 1936

Ethnology

SOURCE BOOK FOR SOCIAL ORIGINS, Sixth Edition—William I. Thomas—*Bruce Humphries,* 932 p., $6. A careful selection of papers introducing the student to the views and researches of such men as Spencer, Frazer, Boas, Westermarck—to name a few outstanding names represented. A valuable feature of the volume is the plan of the bibliographic references, including such sections as books on human society recommended for purchase, for small libraries and for individuals.

Science News Letter, April 11, 1936

Archaeology

EPIGRAPHICA. II. ON MARBLE AS A CRITERION FOR DATING REPUBLICAN LATIN INSCRIPTIONS—A. E. Gordon—*Univ. of California Press,* p. 159-167, 25c.

Science News Letter, April 11, 1936

Zoology

MAMMALS OF INDIANA—Marcus Ward Lyon, Jr.—*Reprinted from "The American Midland Naturalist," vol. 17, no. 1; University Press, Notre Dame,* 384 p., $3. This book, which will of course be useful over a large part of the Midwest, treats not only of mammals now existing in Indiana but also of extinct species, both those of prehistoric date and those that the early white settlers found when they came and either drove out or destroyed. A valuable feature consists in maps showing the distribution, by counties, of the animals described.

Science News Letter, April 11, 1936

Biology

OUT OF THE NIGHT; A BIOLOGIST'S VIEW OF THE FUTURE—H. J. Muller—*Vanguard,* 127 p., $1.50. (See p. 228.)

Science News Letter, April 11, 1936

Geology

COPPER RESOURCES OF THE WORLD—16th International Geological Congress—*Pub. by the Congress,* 2 volumes, 855 p., 41 plates, 140 figures. Orders, with remittances, should be sent to the General Secretary, 16th International Geological Congress, c/o U. S. Geological Survey, Washington, D. C. Price to members of the Congress: $5 each vol., $9 for set; to nonmembers: $6 each vol., $10 for set. An exhaustive, detailed account, region by region (and frequently mine by mine) of the world's principal copper-producing formations, both actual and potential. The geology, in especial, comes in for the most careful treatment, with maps, column diagrams, etc., wherever they are pertinent. This work will undoubtedly become the standard reference on its subject.

Science News Letter, April 11, 1936

Law

ALCOHOL UNDER STATE LIQUOR LAWS—SUMMARY AND ANALYSIS: 2nd Ed.—James P. McGovern—*Industrial Alcohol Institute, Inc.,* 346 p. Distributed to members of the Institute and others interested; if reprinted will be available to the public at $2.50. A complete analysis of state laws relating directly or indirectly to alcohol; material which heretofore has been available only in scattered form. Capt. McGovern, as General Counsel for the Industrial Alcohol Institute, is thoroughly versed in his subject.

Science News Letter, April 11, 1936

Meteorology

FLOODS IN THE UNITED STATES, MAGNITUDE AND FREQUENCY—Clarence S. Jarvis and others—*Govt. Print. Off.,* 497 p., $1. Geol. Survey Water-Supply Paper 771. A study so exhaustive must have been a considerable while in the making, yet this bulletin is as timely as the latest newspaper extra in its appearance. The data it contains will have to be revised, in spots, to take into account the record-breaking flood heights that have prevailed in parts of the country this spring; but aside from that, this book will be wanted by every hydraulic engineer, every city planner, every soil conservationist, and by a host of others whose work is affected in one way or another by the height of lawless waters.

Science News Letter, April 11, 1936

Nature Photography

NATURE IN THE WILD—*Scribner's,* 96 p., $2. Just photographs of wild mammals and birds from all over the world, by some of the world's most skilled and nature-knowing photographers. About as fine a picture-book in its field as you're likely to find in a whole year's shopping.

Science News Letter, April 11, 1936

Mineralogy

GETTING ACQUAINTED WITH MINERALS—George Letchworth English—*McGraw-Hill,* 324 p., $2.50. An excellent book for an introductory study of minerals, especially if you have to be your own teacher. It not only tells about the minerals themselves, in accurate descriptions and good pictures, but also discusses such necessary background topics as crystallography, hardness, cleavage, electricity and magnetism, etc. A valuable feature is a compact analytic "key."

Science News Letter, April 11, 1936

Optics

A TEXTBOOK OF LIGHT—L. R. Middleton—*G. Bell and Sons, London,* 288 p., 6s. British text suitable for preparation for entrance examination in English colleges.

Science News Letter, April 11, 1936

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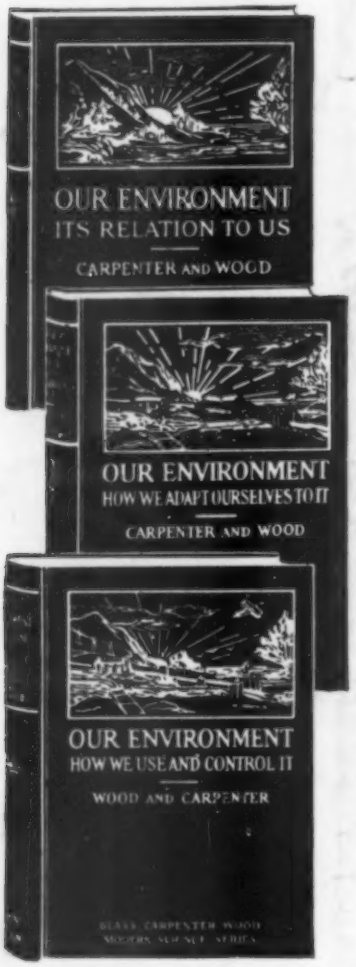
SOCIAL RESPONSIBILITY

"PHILOSOPHY begins in wonder" is as true today as when Plato used these words.

The wonders of science are a bridge to a true philosophy of life. Tested truths and scientific thinking produce these wonders. They produce also tolerance—the withholding of judgment until the facts are determined — distrust of all superstition and of all conclusions which are not based on carefully determined facts.



It is easy to understand why children begin first to wonder, then to think straight, then to develop a true philosophy which influences their conduct, when they study the simple laws and principles which have developed the railroad, the telephone, the radio which brings the whole world within earshot just by the turn of a knob, the airplane with which we cross the continent overnight.

What events in history are as important as the great scientific discoveries of the past made in the midst of religious intolerance and social unrest, occupying a much smaller place in history than this intolerance and unrest but outweighing both in importance and indeed contributing toward putting an end to both?

Four thousand children studying science selected the following as the ten most important results of science: electricity, radio, pasteurization, telephone, anesthetics, vaccination, medicine, X ray, modern transportation, purification of water.

The study and investigation of these children has helped them to think straight. So, in ever-increasing measure, science contributes abundantly to right thinking and conduct. As our children share in its teachings, we may expect them to learn increasingly those principles of open-mindedness and unselfish service which will make them tolerant and responsible members of society.

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